

Legend has it that the yard was established as a standard unit of measure by England's King Henry I. It seems to have been the distance from the tip of his nose to the tip of his thumb when his arm was fully extended. In the next several years, however, Americans will be forsaking King Henry's yard and adapting to the metric system. The following tables may help make your personal shift from ounces and feet to grams and meters a little less traumatic.

## The Metric System and Equivalents

### Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 dekagram = 10 grams = .35 ounce  
 1 hectogram = 10 dekagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.82 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	centimeters	inches	.394
feet	meters	.305	meters	feet	3.280
yards	meters	.914	meters	yards	1.094
miles	kilometers	1.609	kilometers	miles	.621
square inches	square centimeters	6.451	square centimeters	square inches	.155
square feet	square meters	.093	square meters	square feet	10.764
square yards	square meters	.836	square meters	square yards	1.196
square miles	square kilometers	2.590	square kilometers	square miles	.386
acres	square hectometers	.405	square hectometers	acres	2.471
cubic feet	cubic meters	.028	cubic meters	cubic feet	35.315
cubic yards	cubic meters	.765	cubic meters	cubic yards	1.308
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
			metric tons	short tons	1.102

# INCHING AHEAD INTO THE METRIC SYSTEM

For quarts and pounds, the end is now in sight. U.S.—last major holdout—is on the way going metric. The latest netable—

"Metrics," as it is now commonly led, is starting to take hold across U.S.

As one top executive puts it, American industry "already is centimetering way into the metric system."

The rest of the nation, too, appears to be accepted as inevitable the fact at quarts and pounds are to be replaced by liters and kilograms—yards and miles by meters and kilometers.

Big impetus for conversion now, explains Malcolm O'Hagan, executive director of the American National Metric Council, stems from the nation's biggest sporting firms. These companies are under the gun to shift their basic measurements to conform with those used by the rest of the world.

With Britain substantially converted to metric, and Canada beginning its formal shift this year, the U.S. is left as the sole major nation still on an inches-and-miles system. The next-largest country still using this system exclusively is the island of Barbados.

**A beginning.** Already, pilot programs using metric measurements have been begun by multinational U.S. companies—including the major auto firms, plus IBM, Hewlett-Packard, Caterpillar Tractor, International Harvester, Levi Strauss and Seven-Up. All the large aircraft and aerospace firms, such as Lock-

heed, Northrop and TRW, are shifting now, as well.

The National Park Service is placing signs showing metric distances on roadways and footpaths in all federal parks. Its brochures and maps are similarly marked with kilometer distances.

Four States—Illinois, Ohio, Alabama and New Jersey—are putting up highway signs in metric language. Many metropolitan areas in other States have road signs in both miles and kilometers.

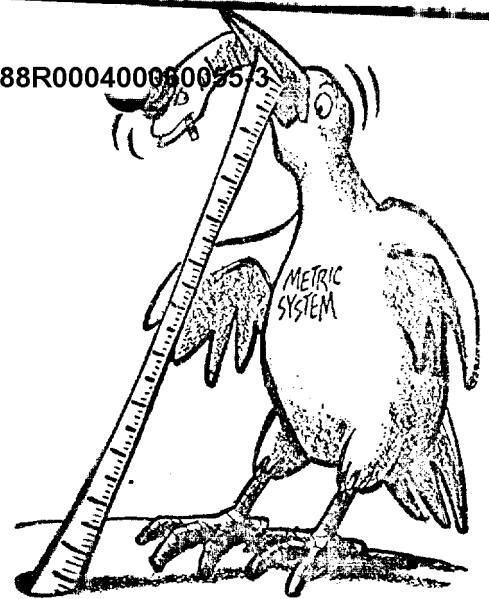
Plans are for all States to be teaching the metric system in their schools by 1978, with such projects already under way in California, Illinois, New Jersey, Maryland and New Mexico.

Radio and TV stations in some areas are starting to report weather temperatures and other data in "Celsius"—the metric counterpart of Fahrenheit—from conversion information supplied by the National Weather Service.

In recent weeks, both U.S. Steel and Bethlehem Steel have announced that they will produce raw steel to metric dimensions. This is considered a major breakthrough in the conversion of American manufacturing firms to the metric system.

**Free rein.** Congress, meanwhile, appears to be on the verge of passing legislation that will make the shift to metric official. A bill has been approved by the House and is scheduled for a vote in the Senate not long after Thanksgiving—with its prospects considered "favorable" there. The bill sets no deadline for complete conversion; instead, it gives free rein to those who want to switch.

The probable timetable for spreading the metric system around the U.S. now,



MAULDIN FOR FIELD NEWSPAPER SYNDICATE  
"INCHWORM"

according to Robert Hopkins, editor of the *American Metric Journal*, is this:

First to shift to widespread use of grams and liters will be food packagers.

Then by January, 1979, all U.S. firms which do business in Europe will have gone metric. Reason: They would otherwise be shut out of Common Market countries, where all products must be metrically marked by then.

Petroleum will come next, with gasoline sold by the liter—which is somewhat larger than a quart. Agricultural products, because of their role in export trade, also will be marketed in metric terms. All U.S. wine will be sold by the liter, rather than by the quart or fifth.

By 1980, Mr. Hopkins believes, most packaging and canning will be measured metrically. Paint manufacturers, for instance, will probably raise the size of their gallon containers to 4 liters.

Within five years, thus, Americans would be using metrics extensively.

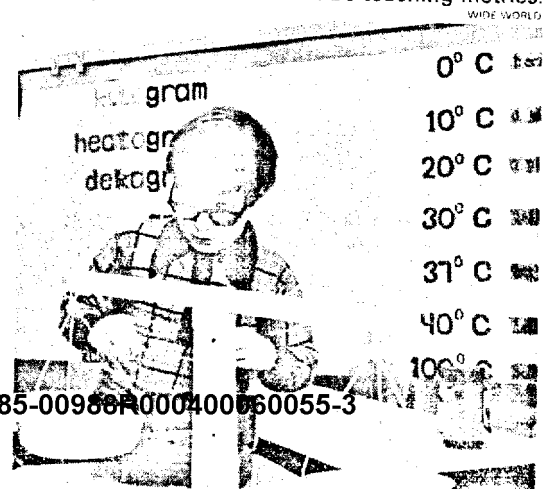
As of now, the changed system of weights and measures is appearing in all parts of the country.

The industrial Midwest is out in front,

Highway speed-limit signs in metric are added by city of Redondo Beach, Calif.

Tools with metric measurements are becoming common in Detroit factories.

Schools in Maryland suburb now teach the system. By 1978, all States will be teaching metrics.



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with conversion to metrics well under way in the auto industry and sparking the change in others.

General Motors has been the most aggressive in making the shift. The new Chevrolet Chevette, with components made abroad, is the first U.S. car to have nearly all metric measurements. Other GM models are scheduled to follow next year. Meanwhile, thousands of GM employees are being trained in metrics. About 15 per cent of the total payroll are getting some training, and a third of those receive specialized schooling in the technicalities involved.

Ford also is moving ahead in metrics, though at a slower pace. Officials there say that any completely new part is designed and built in millimeters now rather than inches, while remodeling of old parts usually is kept in inches.

Chrysler is at about the same stage at the moment. A new subcompact car scheduled for 1978 will be all in metric,

as will a new design of Chrysler's gas-turbine engine designed for use in smaller autos.

A Detroit suburb—Wayne, Mich.—has proclaimed itself "Metric City, USA." It has set up special metric courses in the schools, established a metric information center, and erected signs giving all distances in kilometers.

**A near-best seller.** Elsewhere in the Midwest, the Illinois interstate-highway system is changing over to a dual system of road signs, giving both miles and kilometers. Chicago radio stations are offering special broadcasts sponsored by the Better Business Bureau on metric conversion. Indiana's Seven-Up distributors have converted completely to 1-liter containers.

And a Wisconsin publisher offered a small 50-cent booklet entitled "Modern Metric System Explained"—and found itself with a near-best seller.

Typical of many Midwest manufacturers, Whirlpool plans to begin conversion in both its freezer plant in St. Paul, Minn., and its trash-compactor operation at Danville, Ky., during 1976. Full conversion of the firm's operations will be spread over about five years.

In the Northeastern U.S., a survey of leading companies shows those with heavy exports shifting to metric now. Most others are tending to postpone action until they see what kind of metric legislation Congress will enact.

Exxon Corporation, for example, plans to convert its research and design to metric by January, 1978, according to H. B. Glaser, manager of the mechanical division of Exxon Research in Linden, N.J.

Otis Elevator Company has started building a line of escalators to metric dimensions, while designing a new elevator to those measurements. That firm's aim is to produce all newly designed machines in metric dimensions, so they can be sold or serviced anywhere in the world, says William Edge, an official at its Mahwah, N.J., engineering center.

**Southwest: slow.** The shift toward the metric system is going more slowly in the Southwest. Officials there say they face "a formidable task of education" before metrics takes over completely.

As one example, Cooper Industries, a Houston-based firm pates that it will take at least

years to switch to metrics. The reason, explained by Fred Hegi, a Cooper executive: The firm's sales in metric measuring devices accounted for less than 1 per cent of total sales in 1974.

The Houston independent school district has been including metric instruction in high-school math and science classes for several years, and at the elementary-school level on an experimental basis recently.

Next year, with the adoption of new textbooks, metrics will be taught at the elementary level on a regular basis throughout the Houston school system.

In the Southeast, the North Carolina State board of education has ordered that all instruction involving measurements will be given in the metric system by 1981. The more familiar English system then will be taught only in a "historical context," school officials say.

Right now, even first graders at Charlotte-Mecklenburg schools are taught to measure in centimeters—as part of a five-year program of intensive metric training in its third year.

Celotex, a building-materials firm in Tampa, has been making ceiling tile for the European market for years to metric specifications, says M. M. Harnbrick, vice president for production. Yet, he adds, the building industry here is waiting for federal legislation and guidelines before making a major shift.

As Pomona Products Company, a canning subsidiary of Stokely-Van Camp in Griffin, Ga., makes required changes in its labels, it plans to include dual measurements, reports President Hugh Hunt.

**Far West faster.** In the Far West things are moving even faster. Within a few months, Rockwell International's automotive division in California will be using metrics on all new designs and on major redesigns.

An engineer with Bechtel, the worldwide design and construction firm headquartered in San Francisco, says: "In five years practically all our work will be in metrics."

All the top California wine makers are shifting to seven metric sizes for their bottles, with the transition to be completed by January, 1979, under new Treasury Department rules.

Just when the conversion to the metric system in America will be complete remains to be seen—even if Congress votes the new bill as expected. There is a practical problem, summed up this way by B. A. Phelps, a top Bechtel official:

"The greatest challenge in conversion is one of co-ordination. Nobody goes metric alone. Our change must be with that of others in U.S. industry—and with client demand."

## A DISSENTING VOICE

*From an article by Dean Krakel, director of the National Cowboy Hall of Fame in Oklahoma City, in the publication Persimmon Hill:*

"Why are we being slowly converted to the metric system? Experts in Washington, D.C., say we should change. It's more efficient? Once accomplished, our standards will be like the European and Communist countries. Again, why?

"Will some sign in the future read 90 kilometers to Deadwood? And what about the future of our system of land measurement stemming from our Founding Fathers; the township, section and school district? Why change?

"Think of the impact. The cost will run into billions. . . . The West was won by the inch, foot, yard and mile; we milked our cows into pails by the gallon, quart and pint; we built houses and barns by the board foot. I'm opposed to . . . the metric system.

"Who are the people who are changing all this—doing away with the historic names of mountain passes, changing names to numbers, obliterating records of past achievement? Are these the same people who have merged our small-town and country schools, destroying much of our local pride? How truly independent are we as a people on the eve of our nation's celebrated Bicentennial?"